

Notice of Allowability

Application No.

10/727,860

Examiner

Justin Krause

Applicant(s)

ASADA ET AL.

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to communications filed January 16, 2007.
2. ☒ The allowed claim(s) is/are 1,3,5,6.
3. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☒ All b) ☐ Some* c) ☐ None of the:
 1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
 5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO/SB/08),
Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit
of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☒ Interview Summary (PTO-413),
Paper No./Mail Date 20070322.
7. ☒ Examiner's Amendment/Comment
8. ☐ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

EXAMINER'S AMENDMENT

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Clark Jablon on March 22, 2007. A telephone interview proposing amendments was made on March 20, 2007.

The application has been amended as follows:

IN THE CLAIMS:

Claim 1 has been replaced with:

--A hydrodynamic bearing comprising:

- a sleeve having a bearing hole at the nearly central portion thereof,
- a shaft rotatably inserted into said bearing hole of said sleeve, and
- a nearly disc-shaped flange secured to one end of said shaft, one face of said flange opposing to the end face of said sleeve and the other face thereof opposing to a thrust plate provided to hermetically seal a region including said end face of said sleeve, wherein

- herringbone-shaped first and second dynamic pressure generation grooves are provided on at least one of the inner circumferential face of said sleeve and the outer circumferential face of said shaft so as to be arranged in the direction along said shaft,

- herringbone-shaped third dynamic pressure generation grooves are provided on at least one of the mutually opposed faces of said flange and said thrust plate,

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said first, second and third dynamic pressure generation grooves are filled with oil having a kinematic viscosity of 4 cSt or more at 40°C of temperature,

one of said sleeve and said shaft is secured to a base and the other is secured to a rotatable hub rotor, and

where an outside diameter of the herringbone pattern of said third dynamic pressure generation groove is designated as d_{1o} , an inside diameter thereof is designated as d_{1i} , a diameter of the turn-back part of the herringbone pattern is designated as d_{1m} , the value of the diameter d_{1m} being in the range of 1 mm or more and 10 mm or less, wherein a diameter where the oil pressure generated by said third dynamic pressure generation grooves in the direction from the outer circumference to the inner circumference of said flange equals the oil pressure generated in the direction from the inner circumference to the outer circumference thereof is designated as dsy and is represented by:

$$dsy = \{(d_{1i}^2 + d_{1o}^2)/2\}^{1/2},$$

the diameter d_{1m} of the turn-back part is determined so that the value obtained by subtracting the diameter d_{1m} from the diameter dsy , ($dsy - d_{1m}$), is in the range of 0.05 mm or more and 0.8 mm or less. --

Claim 3 has been replaced with:

--A hydrodynamic bearing comprising:

a sleeve having a bearing hole at the nearly central portion thereof,
a shaft rotatably inserted into said bearing hole of said sleeve, and
a nearly disc-shaped flange, secured to one end of said shaft, one face of said flange opposing to the end face of said sleeve and the other face thereof opposing to a thrust plate provided to hermetically seal a region including said end face of said sleeve, wherein

herringbone-shaped first and second dynamic pressure generation grooves are provided on at least one of the inner circumferential face of said sleeve and the

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outer circumferential face of said shaft, among said first and second dynamic pressure generation grooves, where the grooves away from said thrust plate are designated as said first dynamic pressure generation grooves and the grooves close thereto are designated as said second dynamic pressure generation grooves,

a first length L1 of the groove portion which is away from said thrust plate in said herringbone-shaped first dynamic pressure generation groove in the direction of said shaft is larger than a second length L2 of the groove portion which is close to said thrust plate in the direction of said shaft, and the value of a calculation expression, $(L1 + L2)/(2 \times L2)$ represented by said first length L1 and said second length L2, is in the range of 1.02 to 1.60,

said herringbone-shaped second dynamic pressure generation groove is made symmetric with respect to a line passing through herringbone-shaped turn-back parts,

herringbone-shaped third dynamic pressure generation grooves are provided on at least one of the opposed faces of said flange and said thrust plate,

said first, second and third dynamic pressure generation grooves are filled with oil having a kinematic viscosity of 4 cSt or more at 40°C of temperature,

one of said sleeve and said shaft is secured to a base and the other is secured to a rotatable hub rotor, and

where an outside diameter of the herringbone pattern of said third dynamic pressure generation groove is designated as d1o, an inside diameter thereof is designated as d1i, a diameter of the turn-back part of the herringbone pattern is d1m, wherein a diameter where the oil pressure generated by said third dynamic pressure generation grooves in the direction from the outer circumference to the inner circumference of said flange equals the oil pressure generated in the direction from the inner circumference to the outer circumference thereof is designated as dsy and is represented by:

$$dsy = \{(d1i^2 + d1o^2)/2\}^{1/2},$$

the diameter d_{1m} of said turn-back portion is determined so that when the diameter of said shaft is in the range of 1 mm or more and 10 mm or less, the value obtained by subtracting said length L_2 from said length L_1 is set in the range of 0.05 or more and 1.5 mm or less, the diameter d_{1m} is in the range of 1 mm or more and 10 mm or less, and the value obtained by subtracting the diameter d_{1m} from the diameter d_{sy} is in the range of 0.05 mm or more and 0.8 mm or less.--

Claim 4 has been cancelled.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Justin Krause whose telephone number is 571-272-3012. The examiner can normally be reached on Monday - Friday, 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Ridley can be reached on 571-272-6917. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JMK
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Thomas R. Hannon
Primary Examiner